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**Myung et al.**

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(54) **HYDROGEL ARTHROPLASTY DEVICE**

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***A61F 2/30*** (2006.01)

(52) **U.S. Cl.**
USPC ..... **623/23.58**; 623/23.6; 623/13.11; 623/18.11

(58) **Field of Classification Search**
USPC ..... 623/11.11–23.76
See application file for complete search history.

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(57) **ABSTRACT**

An arthroplasty device is provided having an interpenetrating polymer network (IPN) hydrogel that is strain-hardened by swelling and adapted to be held in place in a joint by conforming to a bone geometry. The strain-hardened IPN hydrogel is based on two different networks: (1) a non-silicone network of preformed hydrophilic non-ionic telechelic macromonomers chemically cross-linked by polymerization of its end-groups, and (2) a non-silicone network of ionizable monomers. The second network was polymerized and chemically cross-linked in the presence of the first network and has formed physical cross-links with the first network. Within the IPN, the degree of chemical cross-linking in the second network is less than in the first network. An aqueous salt solution (neutral pH) is used to ionize and swell the second network. The swelling of the second network is constrained by the first network resulting in an increase in effective physical cross-links within the IPN.

**11 Claims, 29 Drawing Sheets**